IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Klaus SCHULTES, et al.

GROUP: 1712

SERIAL NO: 10/502,057

EXAMINER: MOORE

FILED: October 28, 2004

FOR: IMPACT-RESISTANT MOLDING MATERIALS AND MOLDINGS

REPLY BRIEF

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Responsive to the Examiner's Answer of February 22, 2007, please consider the following:

The Examiner adheres to the rejection of

(1.) Claims 1, 2, 4-6 and 9-16 under 35 U.S.C. § 103(a) over Geck et al,

(2.) Claims 1, 2, 4-7 and 9-15 under 35 U.S.C. § 103(a) over Mautner et al, and

(3.) the provisional obviousness-type double patenting rejection of Claims 1, 2 and 4-16 over claims 18-25 of co-pending application Serial No. 10/501, 467.

These rejections are again traversed.

Specifically, the invention relates to an impact-resistant molding material comprising

poly(meth)acrylate and

at least one silicone rubber graft copolymer comprising

from 0.05 to 95% by weight, based on the total weight of the copolymer, of a core a)

comprising an organosilicon polymer which has the general formula $(R_2SiO_{2/2})_x \cdot (RSiO_{3/2})_y \cdot (SiO_{4/2})_z$ where x = from 0 to 99.5 mol%, y = from 0.5 to 100 mol%, z = from 0 to 50 mol%, where R means identical or different alkyl or alkenyl radicals having from 1 to 6 carbon atoms, aryl radicals, or substituted hydrocarbon radicals,

from 0 to 94.5% by weight, based on the total weight of the copolymer, of a polydialkylsiloxane layer b), and

from 5 to 95% by weight, based on the total weight of the copolymer, of a shell c) comprising organic polymers, wherein the core a) encompasses vinyl groups prior to the grafting process, and the shell c) is obtained via free-radical polymerization of a mixture in which acrylic esters and methacrylates are present,

wherein the ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) is in the range from 50:50 to 1:99.

It is submitted that the claims are NOT obvious over Geck et al or Mautner et al, within the meaning of 35 U.S.C. § 103.

As agreed by the Examiner, Geck et al or Mautner et al fail to disclose or suggest an impact-resistant molding material as claimed comprising **PMMA** and in which the at least one silicone rubber graft copolymer comprises from 5 to 95% by weight, based on the total weight of the copolymer, of a shell c) comprising organic polymers, wherein the core a) encompasses vinyl groups prior to the grafting process, and the shell c) is obtained via free-radical polymerization of a mixture in which acrylic esters and methacrylates are present, wherein the ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) is in the range from **50:50 to 1:99**. See Examiner's Answer at page 8, 3rd full paragraph.

The Examiner states that Geck et al use the final products as powder coatings rather than as molding material. See Examiner's Answer at page 8, 4th full paragraph.

Geck et al disclose another type of elastomeric particles which are pre-crosslinked. See col. 2, lines 41and 58-59. The particles are used to modify **coatings** and not molding materials as claimed. See col. 2, lines 43 and 56-57. The ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) in the range from **50:50 to 1:99** is not disclosed in Geck et al.

Mautner et al describe the composition and process of preparation of elastomeric particles. See col. 2, starting at line 64. However, the notched impact strength of the particles is very low compared to that of the present invention (see Tables below) because the ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) in the range from **50:50 to 1:99** is not disclosed in Mautner et al.

Geck et al or Mautner et al do not recognize that the claimed ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) in the range from **50:50 to 1:99** gives superior results in impact strength.

The Examples in the specification describe the superior properties of the present invention as discussed in the Appeal Brief with reference to Tables 4 and 5 at pages 23-29 of the specification. The Examples relate to preferred embodiments in which in shell c) methyl methacrylate and ethyl acrylate are mixed. See Table 1 at page 24 of the specification. Comparative Examples 1 and 2 only use methyl methacrylate as monomer in shell c) (modifiers B and C in Table 1). As noted by the Examiner, Example 3 of Geck et al only shows a shell using polymethyl methacrylate. See Examiner's Answer at page 3, 2nd full paragraph from the bottom.

So, **Geck et al therefore suggest that it makes no difference whether a ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) in the range from 50:50 to 1:99 is used or whether only polymethyl methacrylate is used.** Thus,

there is no suggestion to use the claimed ratio and to thereby improve the impact resistance a shown by the data of the specification.

Comparative Examples 1 and 2 represent a comparison with the closest Example of Geck et al as they only use methyl methacrylate as monomer in shell c) (modifiers B and C in Table 1 of the specification). As discussed in the Appeal Brief, from the data set out in Table 4 it can be seen that modifiers obtained by grafting a shell comprising a mixture in which acrylic esters and methacrylates are present onto a vinyl-containing core can give an **excellent improvement in the impact resistance of PMMA** molding materials. Note the much higher Mini-Vicat and Izod NIS values in Tables 4 and 5 of the specification.

As noted by the Examiner, Mautner et al prepare shells using polymethyl methacrylate. See Examiner's Answer at page 6, 1st full paragraph.

So, **Mautner et al therefore suggest that it makes no difference whether a ratio by weight of acrylic ester to methacrylate in the mixture for preparing the shell c) in the range from 50:50 to 1:99 is used or whether only polymethyl methacrylate is used.** Thus, there is no suggestion to use the claimed ratio and to thereby improve the impact resistance a shown by the data of the specification.

Table 4

	Inventive example 1	Comparative example 1	Comparative example 2
Die swell [%]	22.7	15.4	26.7
Viscosity η_s (220°C/5 MPa) [Pa s]	2180	2447	2075
Mini-Vicat [°C]	100.5	99.1	98.7
Izod NIS [kJ/m^2]			
23°C	5.6	3.22	5.25
-20°C	5.0	2.88	4.18
-40°C	4.4		
Modulus of elasticity [MPa]	2320	2129	2277

Table 4: Continuation

	Inventive example 2	Inventive example 3	Inventive example 4
Die swell [%]			
MVR (230°C/3.8 kg) [cm^3/10 min]	2.25	1.94	2.45
Mini-Vicat [°C]	101.0	100.6	100.9
Izod NIS [kJ/m^2]			
23°C	6.4	5.7	6.1
-20°C	5.4	4.5	5.3
Modulus of elasticity [MPa]			

Table 5

	Inventive example 1	Comparative example 3	Inventive example 6
Die swell [%]	22.7	25	19.8
Viscosity η_s (220°C/5 MPa) [Pa s]	2180	1930	2380
Mini-Vicat [°C]	100.5	100	100
Izod NIS [kJ/m^2] 23°C	5.6	4.3	6.4
Modulus of elasticity [MPa]	2320	2400	2200

Table 5 shows that mixtures of acrylate rubber modifiers with silicone rubber modifiers have superior impact resistance values at room temperature. The selection of the mixtures was such that their softening point was similar. This improvement in impact resistance values at room temperature is attributable to unforeseeable synergy.

These superior results are not disclosed or suggested by Geck et al or Mautner et al.

Further, MPEP 822.01 provides instructions regarding provisional double patenting rejections. Since Serial No. 10/501, 467 has not yet issued as a patent, Applicants request the Examiner to withdraw the **provisional double patenting** rejection if it is the only issue remaining in one case and convert the provisional rejection in the other application to a double patenting rejection. MPEP 822.01.

For the above reasons, it is respectfully requested that all the rejections still pending in the Final Office Action be REVERSED.

Respectfully submitted,

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